



Assessment Decision Report Indian Creek

Assessment Unit ID: AL06030002-0501-110

Organic Enrichment (CBOD, NBOD)

Alabama Department of Environmental Management
Water Quality Branch
Water Division
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1.0 Executive Summary

Indian Creek, classified as *Fish & Wildlife (F&W)* and a tributary to the Tennessee River in North-Central Alabama in Madison County near Huntsville, was initially placed on Alabama's 1996 Clean Water Act (CWA) §303(d) list of impaired waters for siltation, organic enrichment (OE), and priority organics (DDT). Impaired macroinvertebrate and fish communities were indicated by biological data collected by the Tennessee Valley Authority (TVA) in 1994 and 1995. It was concluded that the macroinvertebrate health was poor/fair, and the fish health was poor.

The Alabama Department of Environmental Management (ADEM) conducted sampling at two stations along the 6.49-mile reach of Indian Creek for five months in 1988 and sampled the same two stations in 1998 during three separate months. However, no dissolved oxygen violations were recorded in either of the two studies conducted by ADEM.

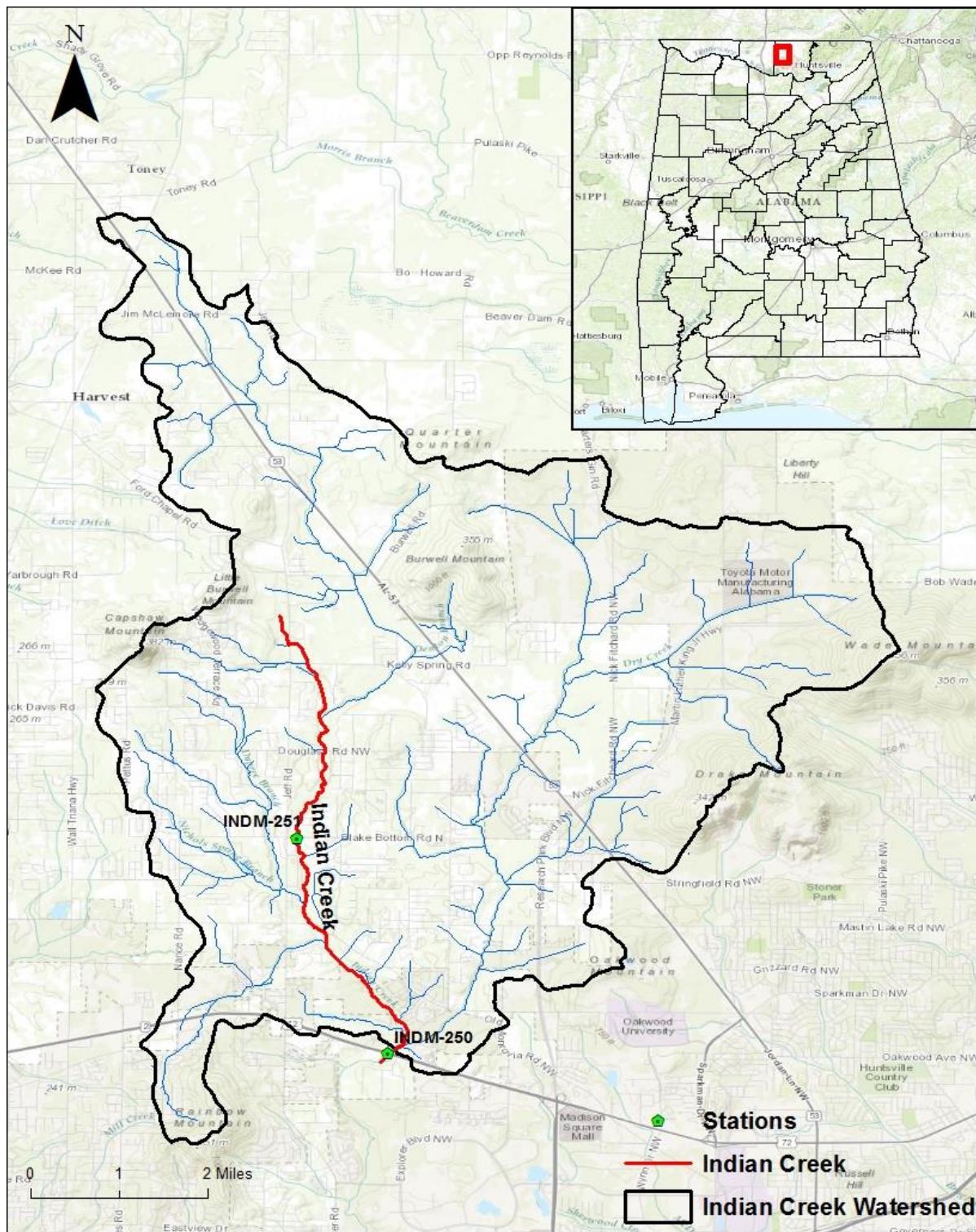
In 2002, a TMDL was developed to address organic enrichment, which included both carbonaceous biochemical oxygen demand (CBOD) and nitrogenous biochemical oxygen demand (NBOD). This TMDL was approved on October 31, 2002. All potential sources of organic loading in the watershed were identified based on an evaluation of current land use/cover information on watershed activities (e.g., agricultural management activities). The source assessment was used as the basis for development of the ultimate analysis of the TMDL allocations. Organic loading within the watershed incorporated both point and non-point sources.

The following year, in 2003, a TMDL was developed in order to address the siltation impairment in Indian Creek. It was approved on October 20, 2003. The purpose of the TMDL was to establish the acceptable loading of sediment from all sources, such that long-term sediment loading levels in this segment would not create conditions where biological communities and habitat are impaired. In this TMDL, the primary sources of impairment identified were row cropping practices and roadways, which represented greater than 90 percent of the sediment load.

Most recently, in 2012, Indian Creek was removed from Alabama's Clean Water Act §303(d) list for priority organics (DDT). It was determined that a TMDL was not needed for this pollutant as it was being addressed by EPA and ADEM under the CERCLA (Comprehensive Environmental Response, Compensation, and Liability Act) program. As a result, Indian Creek was placed under Category 4B.

This report summarizes the results of the analysis of organic enrichment for the previously listed segment of Indian Creek from AL Hwy 72 to its source. Based on the assessment of available dissolved oxygen water quality data collected at stations INDM-250 and INDM-251, ADEM has determined that Indian Creek is not impaired due to organic enrichment. Consequently, ADEM has determined that this segment of Indian Creek is meeting Water Quality Standards for dissolved oxygen.

It should be noted that an Organic Enrichment TMDL was previously completed for this waterbody and was approved by EPA on October 31, 2002. After additional review of the available data, ADEM has concluded that Indian Creek should not have been listed as impaired for CBOD or NBOD.

Figure 1.1: Indian Creek Watershed Map

2.0 Water Quality Target Identification

According to ADEM's Water Quality Criteria (Administrative Code 335-6-10), the minimum dissolved oxygen concentration allowed in a stream classified as Fish and Wildlife is 5.0 mg/L. The target is established at a depth of 5 feet in waters 10 feet or greater in depth. For waters less than 10 feet in depth, the dissolved oxygen criterion is applied at mid-depth.

The dissolved oxygen criteria for streams classified as Fish and Wildlife are described in ADEM Admin. Code R. 335-6-10-09(5)(e)4.(i) through (iv) as follows:

- (i) For a diversified warm water biota, including game fish, daily dissolved oxygen concentrations shall not be less than 5 mg/l at all times; except under extreme conditions due to natural causes, it may range between 5 mg/l and 4 mg/l, provided that the water quality is favorable in all other parameters. The normal seasonal and daily fluctuations shall be maintained above these levels. In no event shall the dissolved oxygen level be less than 4 mg/l due to discharges from existing hydroelectric generation impoundments. All new hydroelectric generation impoundments, including addition of new hydroelectric generation units to existing impoundments, shall be designed so that the discharge will contain at least 5 mg/l dissolved oxygen where practicable and technologically possible. The Environmental Protection Agency, in cooperation with the State of Alabama and parties responsible for impoundments, shall develop a program to improve the design of existing facilities.
- (ii) In coastal waters, surface dissolved oxygen concentrations shall not be less than 5 mg/l, except where natural phenomena cause the value to be depressed.
- (iii) In estuaries and tidal tributaries, dissolved oxygen concentrations shall not be less than 5 mg/l, except in dystrophic waters or where natural conditions cause the value to be depressed.
- (iv) In the application of dissolved oxygen criteria referred to above, dissolved oxygen shall be measured at a depth of 5 feet in waters 10 feet or greater in depth; and for those waters less than 10 feet in depth, dissolved oxygen criteria will be applied at mid-depth.

Table 2.1 Indian Creek Assessment Information

Assessment Unit ID	Waterbody Name	Downstream	Upstream	Size
AL06030002-0501-110	Indian Creek	Alabama Highway 72	Its Source	6.49 miles

TMDL Listing	NTTS ID	Approval Date	Pollutants
AL/06030002-250-02	4027	10/31/2002	BOD, Carbonaceous BOD, Nitrogenous

3.0 Data Availability & Analysis

Several sources of data were utilized in the evaluation of this segment of Indian Creek. Included in the appendices, Table 5.1 consists of dissolved oxygen (DO) monitoring data collected by ADEM in 1998, 2006, 2007, and 2015 at stations INDM-250 and INDM-251 on Indian Creek (shown in Figure 1.1). During those years, most data points were above the 5.0 mg/L criterion. Some depressed in-stream DO concentrations were recorded in 2006-2007, which were the result of extreme drought causing abnormally low flow conditions. For ADEM Station INDM-250, only two samples recorded by ADEM in 2007 were below 5 mg/L while two samples recorded in both 2006 and 2007 (four total) were below 5 mg/L at ADEM Station INDM-251.

Table 5.2 contains diurnal DO data which were collected at both stations by ADEM in July 2015 in order to monitor the daily in-stream fluctuations of dissolved oxygen. For 72 hours, deployed datasondes recorded DO concentrations every fifteen minutes. At each station, a total of 273 samples were collected. The minimum DO concentration recorded at INDM-250 was 6.12 mg/L while the minimum at INDM-251 was 6.49 mg/L. Figure 3.1 shows the DO data at each station throughout the study.

A summary of the DO data can be found below in Table 3.1. The assessment of the collected data shows that current in-stream DO concentrations are currently meeting the water quality criterion for the state of Alabama.

Table 3.1 Summary of DO Analysis for Indian Creek

Station	Type of Data	Number of Samples	DO < 5 mg/L
INDM-250	Grab	36	2
	Continuous	273	0
INDM-251	Grab	29	4
	Continuous	273	0

Figure 3.1 Plot of Continuous Dissolved Oxygen Data Collected by ADEM on Indian Creek at Stations INDM-250 and INDM-251

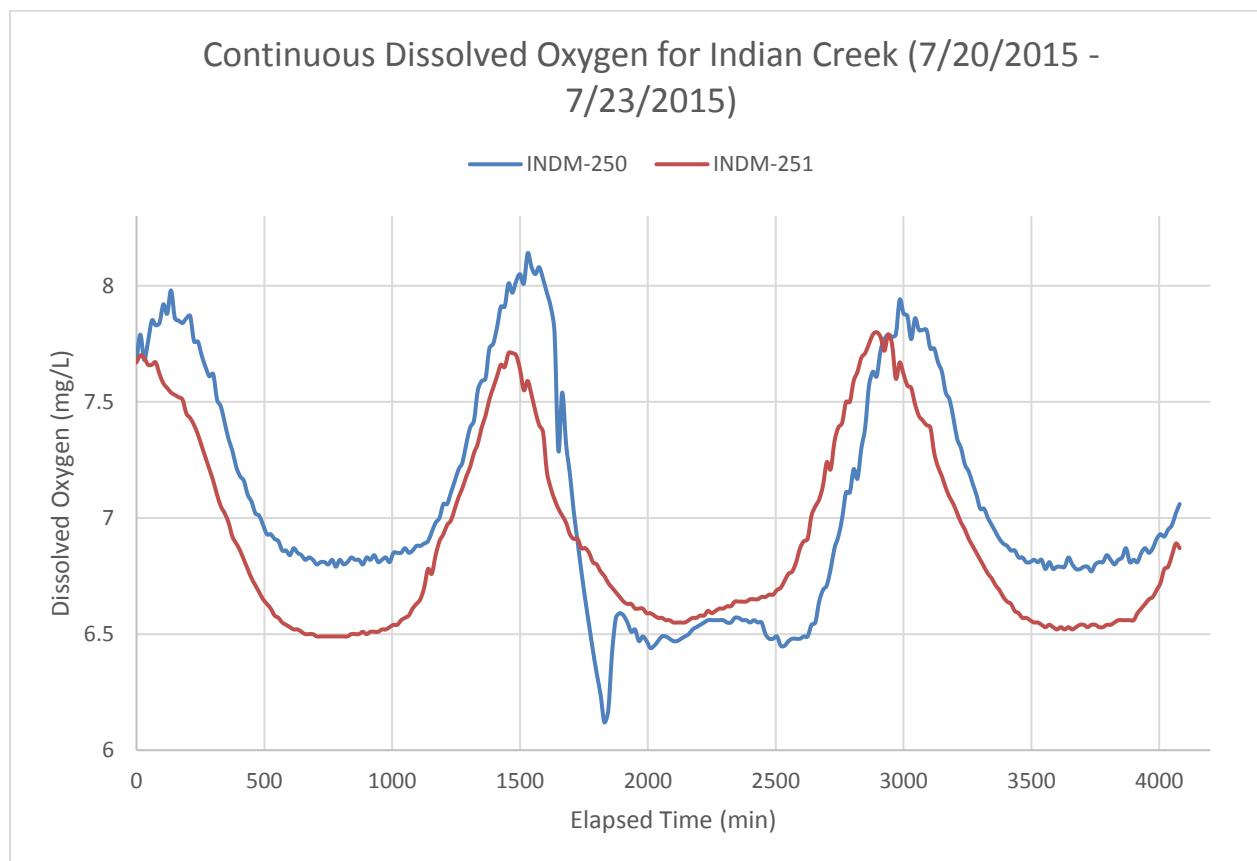


Table 5.3 contains CBOD₅ (Five Day Carbonaceous Biochemical Oxygen Demand) and NH₃ (ammonia) data collected at both stations on Indian Creek in 2006 and 2015. For 2015, the majority of collected data for both CBOD₅ and NH₃ were less than the MDL (Method Detection Limit) along with no DO violations for that year. Analysis of this more recent data indicates that these parameters are not causing any water quality related issues on this section of Indian Creek.

4.0 Conclusions

Based on an examination of all available water quality data and information related to Indian Creek from Highway 72 to its source, there have been no issues regarding CBOD₅, NH₃, or DO. Consequently, ADEM has determined that the organic enrichment impairment does not currently exist.

5.0 Appendices

Table 5.1 Grab Samples: Dissolved Oxygen Data

Station ID	Activity Date	DO (mg/L)
INDM-250	5/12/1998	8.8
INDM-250	7/7/1998	8.3
INDM-250	9/9/1998	8.2
INDM-250	3/9/2006	9.37
INDM-250	4/19/2006	8.9
INDM-250	5/4/2006	8.17
INDM-250	6/7/2006	9.62
INDM-250	6/7/2006	9
INDM-250	7/5/2006	7.12
INDM-250	8/2/2006	7.42
INDM-250	9/19/2006	7.9
INDM-250	10/26/2006	8.4
INDM-250	3/9/2007	10.14
INDM-250	3/23/2007	11.24
INDM-250	4/11/2007	9.17
INDM-250	4/19/2007	10.75
INDM-250	5/4/2007	9.83
INDM-250	5/18/2007	8.86
INDM-250	6/7/2007	8.47
INDM-250	6/14/2007	8.77
INDM-250	7/2/2007	7.35
INDM-250	7/12/2007	2.7
INDM-250	8/22/2007	2.92
INDM-250	8/30/2007	8.41
INDM-250	9/13/2007	8.25
INDM-250	9/27/2007	8.67
INDM-250	10/4/2007	8.59
INDM-250	10/15/2007	9.37
INDM-250	3/10/2015	9.86
INDM-250	4/7/2015	9.55
INDM-250	5/12/2015	8.96
INDM-250	6/16/2015	8.13
INDM-250	6/23/2015	7.8
INDM-250	7/14/2015	8.5
INDM-250	8/11/2015	8.13
INDM-250	9/8/2015	8.33

Station ID	Activity Date	DO (mg/L)
INDM-251	5/12/1998	8.9
INDM-251	7/7/1998	7.6
INDM-251	9/9/1998	7.8
INDM-251	3/9/2006	9.51
INDM-251	4/19/2006	8.1
INDM-251	5/4/2006	8.21
INDM-251	6/7/2006	9.31
INDM-251	6/7/2006	8.3
INDM-251	7/5/2006	4.84
INDM-251	8/2/2006	4.42
INDM-251	9/19/2006	7.12
INDM-251	10/26/2006	9.5
INDM-251	3/9/2007	12.76
INDM-251	3/23/2007	10.55
INDM-251	4/11/2007	9.25
INDM-251	4/19/2007	10.61
INDM-251	5/4/2007	9.43
INDM-251	5/18/2007	8.66
INDM-251	7/2/2007	4.89
INDM-251	7/12/2007	5.31
INDM-251	9/13/2007	4.01
INDM-251	3/10/2015	9.57
INDM-251	4/7/2015	9.52
INDM-251	5/12/2015	9.16
INDM-251	6/16/2015	8.08
INDM-251	6/23/2015	7.85
INDM-251	7/14/2015	8.08
INDM-251	8/11/2015	7.85
INDM-251	9/8/2015	7.96

Table 5.2 Diurnal Dissolved Oxygen Data

Station ID	Date	Time	ODO (mg/L)
INDM-250	7/20/2015	12:30:00	7.68
INDM-250	7/20/2015	12:45:00	7.79
INDM-250	7/20/2015	13:00:00	7.68
INDM-250	7/20/2015	13:15:00	7.76
INDM-250	7/20/2015	13:30:00	7.85
INDM-250	7/20/2015	13:45:00	7.83
INDM-250	7/20/2015	14:00:00	7.84
INDM-250	7/20/2015	14:15:00	7.92
INDM-250	7/20/2015	14:30:00	7.88
INDM-250	7/20/2015	14:45:00	7.98
INDM-250	7/20/2015	15:00:00	7.86
INDM-250	7/20/2015	15:15:00	7.85
INDM-250	7/20/2015	15:30:00	7.84
INDM-250	7/20/2015	15:45:00	7.86
INDM-250	7/20/2015	16:00:00	7.87
INDM-250	7/20/2015	16:15:00	7.76
INDM-250	7/20/2015	16:30:00	7.76
INDM-250	7/20/2015	16:45:00	7.7
INDM-250	7/20/2015	17:00:00	7.65
INDM-250	7/20/2015	17:15:00	7.61
INDM-250	7/20/2015	17:30:00	7.62
INDM-250	7/20/2015	17:45:00	7.51
INDM-250	7/20/2015	18:00:00	7.48
INDM-250	7/20/2015	18:15:00	7.41
INDM-250	7/20/2015	18:30:00	7.34
INDM-250	7/20/2015	18:45:00	7.29
INDM-250	7/20/2015	19:00:00	7.22
INDM-250	7/20/2015	19:15:00	7.18
INDM-250	7/20/2015	19:30:00	7.16
INDM-250	7/20/2015	19:45:00	7.1
INDM-250	7/20/2015	20:00:00	7.07
INDM-250	7/20/2015	20:15:00	7.02
INDM-250	7/20/2015	20:30:00	7.01
INDM-250	7/20/2015	20:45:00	6.97
INDM-250	7/20/2015	21:00:00	6.93
INDM-250	7/20/2015	21:15:00	6.93
INDM-250	7/20/2015	21:30:00	6.91
INDM-250	7/20/2015	21:45:00	6.9
INDM-250	7/20/2015	22:00:00	6.86
INDM-250	7/20/2015	22:15:00	6.86
INDM-250	7/20/2015	22:30:00	6.84
INDM-250	7/20/2015	22:45:00	6.87
INDM-250	7/20/2015	23:00:00	6.85
INDM-250	7/20/2015	23:15:00	6.84
INDM-250	7/20/2015	23:30:00	6.82
INDM-250	7/20/2015	23:45:00	6.83
INDM-250	7/21/2015	0:00:00	6.82
INDM-250	7/21/2015	0:15:00	6.8
INDM-250	7/21/2015	0:30:00	6.81
INDM-250	7/21/2015	0:45:00	6.81
INDM-250	7/21/2015	1:00:00	6.8

Station ID	Date	Time	ODO (mg/L)
INDM-250	7/21/2015	1:15:00	6.82
INDM-250	7/21/2015	1:30:00	6.79
INDM-250	7/21/2015	1:45:00	6.82
INDM-250	7/21/2015	2:00:00	6.8
INDM-250	7/21/2015	2:15:00	6.81
INDM-250	7/21/2015	2:30:00	6.83
INDM-250	7/21/2015	2:45:00	6.82
INDM-250	7/21/2015	3:00:00	6.82
INDM-250	7/21/2015	3:15:00	6.8
INDM-250	7/21/2015	3:30:00	6.83
INDM-250	7/21/2015	3:45:00	6.82
INDM-250	7/21/2015	4:00:00	6.84
INDM-250	7/21/2015	4:15:00	6.81
INDM-250	7/21/2015	4:30:00	6.82
INDM-250	7/21/2015	4:45:00	6.83
INDM-250	7/21/2015	5:00:00	6.81
INDM-250	7/21/2015	5:15:00	6.85
INDM-250	7/21/2015	5:30:00	6.85
INDM-250	7/21/2015	5:45:00	6.85
INDM-250	7/21/2015	6:00:00	6.87
INDM-250	7/21/2015	6:15:00	6.85
INDM-250	7/21/2015	6:30:00	6.86
INDM-250	7/21/2015	6:45:00	6.88
INDM-250	7/21/2015	7:00:00	6.88
INDM-250	7/21/2015	7:15:00	6.89
INDM-250	7/21/2015	7:30:00	6.9
INDM-250	7/21/2015	7:45:00	6.94
INDM-250	7/21/2015	8:00:00	6.98
INDM-250	7/21/2015	8:15:00	7
INDM-250	7/21/2015	8:30:00	7.06
INDM-250	7/21/2015	8:45:00	7.06
INDM-250	7/21/2015	9:00:00	7.11
INDM-250	7/21/2015	9:15:00	7.16
INDM-250	7/21/2015	9:30:00	7.21
INDM-250	7/21/2015	9:45:00	7.24
INDM-250	7/21/2015	10:00:00	7.32
INDM-250	7/21/2015	10:15:00	7.39
INDM-250	7/21/2015	10:30:00	7.42
INDM-250	7/21/2015	10:45:00	7.55
INDM-250	7/21/2015	11:00:00	7.59
INDM-250	7/21/2015	11:15:00	7.6
INDM-250	7/21/2015	11:30:00	7.73
INDM-250	7/21/2015	11:45:00	7.75
INDM-250	7/21/2015	12:00:00	7.82
INDM-250	7/21/2015	12:15:00	7.91
INDM-250	7/21/2015	12:30:00	7.91
INDM-250	7/21/2015	12:45:00	8.01
INDM-250	7/21/2015	13:00:00	7.97
INDM-250	7/21/2015	13:15:00	8.02
INDM-250	7/21/2015	13:30:00	8.05
INDM-250	7/21/2015	13:45:00	8.01

Station ID	Date	Time	ODO (mg/L)
INDM-250	7/21/2015	14:00:00	8.14
INDM-250	7/21/2015	14:15:00	8.08
INDM-250	7/21/2015	14:30:00	8.05
INDM-250	7/21/2015	14:45:00	8.08
INDM-250	7/21/2015	15:00:00	8.03
INDM-250	7/21/2015	15:15:00	7.97
INDM-250	7/21/2015	15:30:00	7.91
INDM-250	7/21/2015	15:45:00	7.8
INDM-250	7/21/2015	16:00:00	7.29
INDM-250	7/21/2015	16:15:00	7.54
INDM-250	7/21/2015	16:30:00	7.32
INDM-250	7/21/2015	16:45:00	7.19
INDM-250	7/21/2015	17:00:00	7.03
INDM-250	7/21/2015	17:15:00	6.9
INDM-250	7/21/2015	17:30:00	6.77
INDM-250	7/21/2015	17:45:00	6.65
INDM-250	7/21/2015	18:00:00	6.54
INDM-250	7/21/2015	18:15:00	6.43
INDM-250	7/21/2015	18:30:00	6.33
INDM-250	7/21/2015	18:45:00	6.24
INDM-250	7/21/2015	19:00:00	6.12
INDM-250	7/21/2015	19:15:00	6.17
INDM-250	7/21/2015	19:30:00	6.42
INDM-250	7/21/2015	19:45:00	6.57
INDM-250	7/21/2015	20:00:00	6.59
INDM-250	7/21/2015	20:15:00	6.58
INDM-250	7/21/2015	20:30:00	6.55
INDM-250	7/21/2015	20:45:00	6.51
INDM-250	7/21/2015	21:00:00	6.52
INDM-250	7/21/2015	21:15:00	6.47
INDM-250	7/21/2015	21:30:00	6.49
INDM-250	7/21/2015	21:45:00	6.47
INDM-250	7/21/2015	22:00:00	6.44
INDM-250	7/21/2015	22:15:00	6.45
INDM-250	7/21/2015	22:30:00	6.47
INDM-250	7/21/2015	22:45:00	6.49
INDM-250	7/21/2015	23:00:00	6.49
INDM-250	7/21/2015	23:15:00	6.48
INDM-250	7/21/2015	23:30:00	6.47
INDM-250	7/21/2015	23:45:00	6.47
INDM-250	7/22/2015	0:00:00	6.48
INDM-250	7/22/2015	0:15:00	6.49
INDM-250	7/22/2015	0:30:00	6.5
INDM-250	7/22/2015	0:45:00	6.52
INDM-250	7/22/2015	1:00:00	6.53
INDM-250	7/22/2015	1:15:00	6.54
INDM-250	7/22/2015	1:30:00	6.55
INDM-250	7/22/2015	1:45:00	6.56
INDM-250	7/22/2015	2:00:00	6.56
INDM-250	7/22/2015	2:15:00	6.56
INDM-250	7/22/2015	2:30:00	6.56
INDM-250	7/22/2015	2:45:00	6.56
INDM-250	7/22/2015	3:00:00	6.55
INDM-250	7/22/2015	3:15:00	6.55
INDM-250	7/22/2015	3:30:00	6.57

Station ID	Date	Time	ODO (mg/L)
INDM-250	7/22/2015	3:45:00	6.57
INDM-250	7/22/2015	4:00:00	6.56
INDM-250	7/22/2015	4:15:00	6.56
INDM-250	7/22/2015	4:30:00	6.55
INDM-250	7/22/2015	4:45:00	6.56
INDM-250	7/22/2015	5:00:00	6.55
INDM-250	7/22/2015	5:15:00	6.55
INDM-250	7/22/2015	5:30:00	6.5
INDM-250	7/22/2015	5:45:00	6.48
INDM-250	7/22/2015	6:00:00	6.48
INDM-250	7/22/2015	6:15:00	6.49
INDM-250	7/22/2015	6:30:00	6.45
INDM-250	7/22/2015	6:45:00	6.45
INDM-250	7/22/2015	7:00:00	6.47
INDM-250	7/22/2015	7:15:00	6.48
INDM-250	7/22/2015	7:30:00	6.48
INDM-250	7/22/2015	7:45:00	6.48
INDM-250	7/22/2015	8:00:00	6.49
INDM-250	7/22/2015	8:15:00	6.49
INDM-250	7/22/2015	8:30:00	6.54
INDM-250	7/22/2015	8:45:00	6.55
INDM-250	7/22/2015	9:00:00	6.64
INDM-250	7/22/2015	9:15:00	6.69
INDM-250	7/22/2015	9:30:00	6.71
INDM-250	7/22/2015	9:45:00	6.78
INDM-250	7/22/2015	10:00:00	6.87
INDM-250	7/22/2015	10:15:00	6.92
INDM-250	7/22/2015	10:30:00	7
INDM-250	7/22/2015	10:45:00	7.11
INDM-250	7/22/2015	11:00:00	7.11
INDM-250	7/22/2015	11:15:00	7.21
INDM-250	7/22/2015	11:30:00	7.17
INDM-250	7/22/2015	11:45:00	7.3
INDM-250	7/22/2015	12:00:00	7.39
INDM-250	7/22/2015	12:15:00	7.57
INDM-250	7/22/2015	12:30:00	7.63
INDM-250	7/22/2015	12:45:00	7.61
INDM-250	7/22/2015	13:00:00	7.72
INDM-250	7/22/2015	13:15:00	7.77
INDM-250	7/22/2015	13:30:00	7.79
INDM-250	7/22/2015	13:45:00	7.78
INDM-250	7/22/2015	14:00:00	7.79
INDM-250	7/22/2015	14:15:00	7.94
INDM-250	7/22/2015	14:30:00	7.88
INDM-250	7/22/2015	14:45:00	7.87
INDM-250	7/22/2015	15:00:00	7.77
INDM-250	7/22/2015	15:15:00	7.86
INDM-250	7/22/2015	15:30:00	7.81
INDM-250	7/22/2015	15:45:00	7.81
INDM-250	7/22/2015	16:00:00	7.81
INDM-250	7/22/2015	16:15:00	7.73
INDM-250	7/22/2015	16:30:00	7.73
INDM-250	7/22/2015	16:45:00	7.67
INDM-250	7/22/2015	17:00:00	7.63
INDM-250	7/22/2015	17:15:00	7.54

Station ID	Date	Time	ODO (mg/L)
INDM-250	7/22/2015	17:30:00	7.51
INDM-250	7/22/2015	17:45:00	7.43
INDM-250	7/22/2015	18:00:00	7.34
INDM-250	7/22/2015	18:15:00	7.3
INDM-250	7/22/2015	18:30:00	7.23
INDM-250	7/22/2015	18:45:00	7.2
INDM-250	7/22/2015	19:00:00	7.15
INDM-250	7/22/2015	19:15:00	7.1
INDM-250	7/22/2015	19:30:00	7.04
INDM-250	7/22/2015	19:45:00	7.04
INDM-250	7/22/2015	20:00:00	7
INDM-250	7/22/2015	20:15:00	6.97
INDM-250	7/22/2015	20:30:00	6.94
INDM-250	7/22/2015	20:45:00	6.91
INDM-250	7/22/2015	21:00:00	6.89
INDM-250	7/22/2015	21:15:00	6.88
INDM-250	7/22/2015	21:30:00	6.86
INDM-250	7/22/2015	21:45:00	6.86
INDM-250	7/22/2015	22:00:00	6.83
INDM-250	7/22/2015	22:15:00	6.83
INDM-250	7/22/2015	22:30:00	6.81
INDM-250	7/22/2015	22:45:00	6.81
INDM-250	7/22/2015	23:00:00	6.82
INDM-250	7/22/2015	23:15:00	6.81
INDM-250	7/22/2015	23:30:00	6.82
INDM-250	7/22/2015	23:45:00	6.78
INDM-250	7/23/2015	0:00:00	6.81
INDM-250	7/23/2015	0:15:00	6.78
INDM-250	7/23/2015	0:30:00	6.79
INDM-250	7/23/2015	0:45:00	6.79
INDM-250	7/23/2015	1:00:00	6.79
INDM-250	7/23/2015	1:15:00	6.83
INDM-250	7/23/2015	1:30:00	6.8
INDM-250	7/23/2015	1:45:00	6.78
INDM-250	7/23/2015	2:00:00	6.78
INDM-250	7/23/2015	2:15:00	6.79
INDM-250	7/23/2015	2:30:00	6.79
INDM-250	7/23/2015	2:45:00	6.77
INDM-250	7/23/2015	3:00:00	6.8
INDM-250	7/23/2015	3:15:00	6.81
INDM-250	7/23/2015	3:30:00	6.81
INDM-250	7/23/2015	3:45:00	6.84
INDM-250	7/23/2015	4:00:00	6.82
INDM-250	7/23/2015	4:15:00	6.8
INDM-250	7/23/2015	4:30:00	6.82
INDM-250	7/23/2015	4:45:00	6.83
INDM-250	7/23/2015	5:00:00	6.87
INDM-250	7/23/2015	5:15:00	6.81
INDM-250	7/23/2015	5:30:00	6.82
INDM-250	7/23/2015	5:45:00	6.81
INDM-250	7/23/2015	6:00:00	6.85
INDM-250	7/23/2015	6:15:00	6.87
INDM-250	7/23/2015	6:30:00	6.85
INDM-250	7/23/2015	6:45:00	6.87
INDM-250	7/23/2015	7:00:00	6.91

Station ID	Date	Time	ODO (mg/L)
INDM-250	7/23/2015	7:15:00	6.93
INDM-250	7/23/2015	7:30:00	6.92
INDM-250	7/23/2015	7:45:00	6.95
INDM-250	7/23/2015	8:00:00	6.97
INDM-250	7/23/2015	8:15:00	7.02
INDM-250	7/23/2015	8:30:00	7.06

Station ID	Date	Time	ODO mg/L
INDM-251	7/20/2015	13:00:00	7.67
INDM-251	7/20/2015	13:15:00	7.7
INDM-251	7/20/2015	13:30:00	7.69
INDM-251	7/20/2015	13:45:00	7.66
INDM-251	7/20/2015	14:00:00	7.66
INDM-251	7/20/2015	14:15:00	7.67
INDM-251	7/20/2015	14:30:00	7.62
INDM-251	7/20/2015	14:45:00	7.58
INDM-251	7/20/2015	15:00:00	7.56
INDM-251	7/20/2015	15:15:00	7.54
INDM-251	7/20/2015	15:30:00	7.53
INDM-251	7/20/2015	15:45:00	7.52
INDM-251	7/20/2015	16:00:00	7.51
INDM-251	7/20/2015	16:15:00	7.45
INDM-251	7/20/2015	16:30:00	7.43
INDM-251	7/20/2015	16:45:00	7.4
INDM-251	7/20/2015	17:00:00	7.36
INDM-251	7/20/2015	17:15:00	7.31
INDM-251	7/20/2015	17:30:00	7.26
INDM-251	7/20/2015	17:45:00	7.21
INDM-251	7/20/2015	18:00:00	7.16
INDM-251	7/20/2015	18:15:00	7.1
INDM-251	7/20/2015	18:30:00	7.05
INDM-251	7/20/2015	18:45:00	7.02
INDM-251	7/20/2015	19:00:00	6.98
INDM-251	7/20/2015	19:15:00	6.92
INDM-251	7/20/2015	19:30:00	6.89
INDM-251	7/20/2015	19:45:00	6.86
INDM-251	7/20/2015	20:00:00	6.82
INDM-251	7/20/2015	20:15:00	6.78
INDM-251	7/20/2015	20:30:00	6.74
INDM-251	7/20/2015	20:45:00	6.71
INDM-251	7/20/2015	21:00:00	6.68
INDM-251	7/20/2015	21:15:00	6.65
INDM-251	7/20/2015	21:30:00	6.63
INDM-251	7/20/2015	21:45:00	6.61
INDM-251	7/20/2015	22:00:00	6.58
INDM-251	7/20/2015	22:15:00	6.57
INDM-251	7/20/2015	22:30:00	6.55
INDM-251	7/20/2015	22:45:00	6.54
INDM-251	7/20/2015	23:00:00	6.53
INDM-251	7/20/2015	23:15:00	6.52
INDM-251	7/20/2015	23:30:00	6.52
INDM-251	7/20/2015	23:45:00	6.51
INDM-251	7/21/2015	0:00:00	6.5
INDM-251	7/21/2015	0:15:00	6.5
INDM-251	7/21/2015	0:30:00	6.5
INDM-251	7/21/2015	0:45:00	6.49
INDM-251	7/21/2015	1:00:00	6.49
INDM-251	7/21/2015	1:15:00	6.49
INDM-251	7/21/2015	1:30:00	6.49
INDM-251	7/21/2015	1:45:00	6.49
INDM-251	7/21/2015	2:00:00	6.49
INDM-251	7/21/2015	2:15:00	6.49
INDM-251	7/21/2015	2:30:00	6.49

Station ID	Date	Time	ODO mg/L
INDM-251	7/21/2015	2:45:00	6.49
INDM-251	7/21/2015	3:00:00	6.5
INDM-251	7/21/2015	3:15:00	6.5
INDM-251	7/21/2015	3:30:00	6.5
INDM-251	7/21/2015	3:45:00	6.51
INDM-251	7/21/2015	4:00:00	6.5
INDM-251	7/21/2015	4:15:00	6.51
INDM-251	7/21/2015	4:30:00	6.51
INDM-251	7/21/2015	4:45:00	6.51
INDM-251	7/21/2015	5:00:00	6.52
INDM-251	7/21/2015	5:15:00	6.52
INDM-251	7/21/2015	5:30:00	6.53
INDM-251	7/21/2015	5:45:00	6.54
INDM-251	7/21/2015	6:00:00	6.54
INDM-251	7/21/2015	6:15:00	6.56
INDM-251	7/21/2015	6:30:00	6.57
INDM-251	7/21/2015	6:45:00	6.58
INDM-251	7/21/2015	7:00:00	6.61
INDM-251	7/21/2015	7:15:00	6.63
INDM-251	7/21/2015	7:30:00	6.65
INDM-251	7/21/2015	7:45:00	6.7
INDM-251	7/21/2015	8:00:00	6.78
INDM-251	7/21/2015	8:15:00	6.76
INDM-251	7/21/2015	8:30:00	6.84
INDM-251	7/21/2015	8:45:00	6.9
INDM-251	7/21/2015	9:00:00	6.93
INDM-251	7/21/2015	9:15:00	6.97
INDM-251	7/21/2015	9:30:00	6.99
INDM-251	7/21/2015	9:45:00	7.04
INDM-251	7/21/2015	10:00:00	7.09
INDM-251	7/21/2015	10:15:00	7.13
INDM-251	7/21/2015	10:30:00	7.18
INDM-251	7/21/2015	10:45:00	7.22
INDM-251	7/21/2015	11:00:00	7.28
INDM-251	7/21/2015	11:15:00	7.32
INDM-251	7/21/2015	11:30:00	7.39
INDM-251	7/21/2015	11:45:00	7.44
INDM-251	7/21/2015	12:00:00	7.51
INDM-251	7/21/2015	12:15:00	7.56
INDM-251	7/21/2015	12:30:00	7.61
INDM-251	7/21/2015	12:45:00	7.66
INDM-251	7/21/2015	13:00:00	7.65
INDM-251	7/21/2015	13:15:00	7.71
INDM-251	7/21/2015	13:30:00	7.71
INDM-251	7/21/2015	13:45:00	7.7
INDM-251	7/21/2015	14:00:00	7.64
INDM-251	7/21/2015	14:15:00	7.55
INDM-251	7/21/2015	14:30:00	7.59
INDM-251	7/21/2015	14:45:00	7.53
INDM-251	7/21/2015	15:00:00	7.46
INDM-251	7/21/2015	15:15:00	7.4
INDM-251	7/21/2015	15:30:00	7.37
INDM-251	7/21/2015	15:45:00	7.2
INDM-251	7/21/2015	16:00:00	7.13
INDM-251	7/21/2015	16:15:00	7.08

Station ID	Date	Time	ODO mg/L
INDM-251	7/21/2015	16:30:00	7.04
INDM-251	7/21/2015	16:45:00	7.01
INDM-251	7/21/2015	17:00:00	6.98
INDM-251	7/21/2015	17:15:00	6.93
INDM-251	7/21/2015	17:30:00	6.91
INDM-251	7/21/2015	17:45:00	6.91
INDM-251	7/21/2015	18:00:00	6.87
INDM-251	7/21/2015	18:15:00	6.87
INDM-251	7/21/2015	18:30:00	6.85
INDM-251	7/21/2015	18:45:00	6.81
INDM-251	7/21/2015	19:00:00	6.8
INDM-251	7/21/2015	19:15:00	6.77
INDM-251	7/21/2015	19:30:00	6.75
INDM-251	7/21/2015	19:45:00	6.72
INDM-251	7/21/2015	20:00:00	6.7
INDM-251	7/21/2015	20:15:00	6.68
INDM-251	7/21/2015	20:30:00	6.66
INDM-251	7/21/2015	20:45:00	6.64
INDM-251	7/21/2015	21:00:00	6.63
INDM-251	7/21/2015	21:15:00	6.63
INDM-251	7/21/2015	21:30:00	6.61
INDM-251	7/21/2015	21:45:00	6.61
INDM-251	7/21/2015	22:00:00	6.61
INDM-251	7/21/2015	22:15:00	6.59
INDM-251	7/21/2015	22:30:00	6.59
INDM-251	7/21/2015	22:45:00	6.58
INDM-251	7/21/2015	23:00:00	6.57
INDM-251	7/21/2015	23:15:00	6.57
INDM-251	7/21/2015	23:30:00	6.56
INDM-251	7/21/2015	23:45:00	6.56
INDM-251	7/22/2015	0:00:00	6.55
INDM-251	7/22/2015	0:15:00	6.55
INDM-251	7/22/2015	0:30:00	6.55
INDM-251	7/22/2015	0:45:00	6.55
INDM-251	7/22/2015	1:00:00	6.56
INDM-251	7/22/2015	1:15:00	6.57
INDM-251	7/22/2015	1:30:00	6.57
INDM-251	7/22/2015	1:45:00	6.58
INDM-251	7/22/2015	2:00:00	6.58
INDM-251	7/22/2015	2:15:00	6.6
INDM-251	7/22/2015	2:30:00	6.59
INDM-251	7/22/2015	2:45:00	6.6
INDM-251	7/22/2015	3:00:00	6.61
INDM-251	7/22/2015	3:15:00	6.61
INDM-251	7/22/2015	3:30:00	6.62
INDM-251	7/22/2015	3:45:00	6.62
INDM-251	7/22/2015	4:00:00	6.64
INDM-251	7/22/2015	4:15:00	6.64
INDM-251	7/22/2015	4:30:00	6.64
INDM-251	7/22/2015	4:45:00	6.64
INDM-251	7/22/2015	5:00:00	6.65
INDM-251	7/22/2015	5:15:00	6.65
INDM-251	7/22/2015	5:30:00	6.65
INDM-251	7/22/2015	5:45:00	6.66
INDM-251	7/22/2015	6:00:00	6.66

Station ID	Date	Time	ODO mg/L
INDM-251	7/22/2015	6:15:00	6.67
INDM-251	7/22/2015	6:30:00	6.67
INDM-251	7/22/2015	6:45:00	6.69
INDM-251	7/22/2015	7:00:00	6.7
INDM-251	7/22/2015	7:15:00	6.73
INDM-251	7/22/2015	7:30:00	6.76
INDM-251	7/22/2015	7:45:00	6.77
INDM-251	7/22/2015	8:00:00	6.81
INDM-251	7/22/2015	8:15:00	6.87
INDM-251	7/22/2015	8:30:00	6.9
INDM-251	7/22/2015	8:45:00	6.91
INDM-251	7/22/2015	9:00:00	7.01
INDM-251	7/22/2015	9:15:00	7.05
INDM-251	7/22/2015	9:30:00	7.08
INDM-251	7/22/2015	9:45:00	7.14
INDM-251	7/22/2015	10:00:00	7.24
INDM-251	7/22/2015	10:15:00	7.21
INDM-251	7/22/2015	10:30:00	7.33
INDM-251	7/22/2015	10:45:00	7.39
INDM-251	7/22/2015	11:00:00	7.41
INDM-251	7/22/2015	11:15:00	7.5
INDM-251	7/22/2015	11:30:00	7.5
INDM-251	7/22/2015	11:45:00	7.59
INDM-251	7/22/2015	12:00:00	7.63
INDM-251	7/22/2015	12:15:00	7.69
INDM-251	7/22/2015	12:30:00	7.71
INDM-251	7/22/2015	12:45:00	7.75
INDM-251	7/22/2015	13:00:00	7.79
INDM-251	7/22/2015	13:15:00	7.8
INDM-251	7/22/2015	13:30:00	7.78
INDM-251	7/22/2015	13:45:00	7.72
INDM-251	7/22/2015	14:00:00	7.79
INDM-251	7/22/2015	14:15:00	7.75
INDM-251	7/22/2015	14:30:00	7.6
INDM-251	7/22/2015	14:45:00	7.67
INDM-251	7/22/2015	15:00:00	7.62
INDM-251	7/22/2015	15:15:00	7.57
INDM-251	7/22/2015	15:30:00	7.56
INDM-251	7/22/2015	15:45:00	7.49
INDM-251	7/22/2015	16:00:00	7.44
INDM-251	7/22/2015	16:15:00	7.42
INDM-251	7/22/2015	16:30:00	7.4
INDM-251	7/22/2015	16:45:00	7.39
INDM-251	7/22/2015	17:00:00	7.28
INDM-251	7/22/2015	17:15:00	7.22
INDM-251	7/22/2015	17:30:00	7.18
INDM-251	7/22/2015	17:45:00	7.13
INDM-251	7/22/2015	18:00:00	7.09
INDM-251	7/22/2015	18:15:00	7.06
INDM-251	7/22/2015	18:30:00	7.02
INDM-251	7/22/2015	18:45:00	6.98
INDM-251	7/22/2015	19:00:00	6.95
INDM-251	7/22/2015	19:15:00	6.91
INDM-251	7/22/2015	19:30:00	6.88
INDM-251	7/22/2015	19:45:00	6.85

Station ID	Date	Time	ODO mg/L
INDM-251	7/22/2015	20:00:00	6.82
INDM-251	7/22/2015	20:15:00	6.79
INDM-251	7/22/2015	20:30:00	6.76
INDM-251	7/22/2015	20:45:00	6.74
INDM-251	7/22/2015	21:00:00	6.71
INDM-251	7/22/2015	21:15:00	6.69
INDM-251	7/22/2015	21:30:00	6.66
INDM-251	7/22/2015	21:45:00	6.64
INDM-251	7/22/2015	22:00:00	6.63
INDM-251	7/22/2015	22:15:00	6.6
INDM-251	7/22/2015	22:30:00	6.59
INDM-251	7/22/2015	22:45:00	6.57
INDM-251	7/22/2015	23:00:00	6.57
INDM-251	7/22/2015	23:15:00	6.56
INDM-251	7/22/2015	23:30:00	6.55
INDM-251	7/22/2015	23:45:00	6.55
INDM-251	7/23/2015	0:00:00	6.54
INDM-251	7/23/2015	0:15:00	6.53
INDM-251	7/23/2015	0:30:00	6.54
INDM-251	7/23/2015	0:45:00	6.53
INDM-251	7/23/2015	1:00:00	6.52
INDM-251	7/23/2015	1:15:00	6.53
INDM-251	7/23/2015	1:30:00	6.52
INDM-251	7/23/2015	1:45:00	6.53
INDM-251	7/23/2015	2:00:00	6.52
INDM-251	7/23/2015	2:15:00	6.53
INDM-251	7/23/2015	2:30:00	6.54
INDM-251	7/23/2015	2:45:00	6.54
INDM-251	7/23/2015	3:00:00	6.53
INDM-251	7/23/2015	3:15:00	6.54
INDM-251	7/23/2015	3:30:00	6.54
INDM-251	7/23/2015	3:45:00	6.53
INDM-251	7/23/2015	4:00:00	6.53
INDM-251	7/23/2015	4:15:00	6.54
INDM-251	7/23/2015	4:30:00	6.54
INDM-251	7/23/2015	4:45:00	6.55
INDM-251	7/23/2015	5:00:00	6.56
INDM-251	7/23/2015	5:15:00	6.56
INDM-251	7/23/2015	5:30:00	6.56
INDM-251	7/23/2015	5:45:00	6.56
INDM-251	7/23/2015	6:00:00	6.56
INDM-251	7/23/2015	6:15:00	6.59
INDM-251	7/23/2015	6:30:00	6.61
INDM-251	7/23/2015	6:45:00	6.63
INDM-251	7/23/2015	7:00:00	6.65
INDM-251	7/23/2015	7:15:00	6.66
INDM-251	7/23/2015	7:30:00	6.69
INDM-251	7/23/2015	7:45:00	6.72
INDM-251	7/23/2015	8:00:00	6.78
INDM-251	7/23/2015	8:15:00	6.79
INDM-251	7/23/2015	8:30:00	6.84
INDM-251	7/23/2015	8:45:00	6.89
INDM-251	7/23/2015	9:00:00	6.87

Table 5.3 Ammonia and CBOD₅ Data

Station ID	Date	CBOD5 mg/l	CBOD5 dc	NH3 mg/l	NH3 dc
INDM-250	3/9/2006	1.4		0.015	< MDL .015
INDM-250	4/19/2006	0.5		0.092	
INDM-250	5/4/2006	0.9		0.015	< MDL .015
INDM-250	6/7/2006	0.1	< MDL .1	0.015	< MDL .015
INDM-250	7/5/2006	0.28		0.015	< MDL .015
INDM-250	8/2/2006	0.1	< MDL .1	0.015	< MDL .015
INDM-250	9/19/2006	0.43		0.015	< MDL .015
INDM-250	10/26/2006	1	< MDL 1	0.015	< MDL .015
INDM-250	3/10/2015	2	< MDL 2	0.007	< MDL .007
INDM-250	4/7/2015	2	< MDL 2	0.028	
INDM-250	5/12/2015	2	< MDL 2	0.028	
INDM-250	6/23/2015	2	< MDL 2	0.007	< MDL .007
INDM-250	7/14/2015	2	< MDL 2	0.007	< MDL .007
INDM-250	8/11/2015	2	< MDL 2	0.103	
INDM-250	9/8/2015	2	< MDL 2	0.007	< MDL .007
INDM-250	10/28/2015	2	< MDL 2	0.007	< MDL .007
INDM-251	3/9/2006	1.2		0.015	< MDL .015
INDM-251	4/19/2006	0.6		0.089	
INDM-251	5/4/2006	0.6		0.015	< MDL .015
INDM-251	6/7/2006	0.1	< MDL .1	0.015	< MDL .015
INDM-251	7/5/2006	0.25		0.027	
INDM-251	8/2/2006	0.66		0.091	
INDM-251	9/19/2006	0.53		0.015	< MDL .015
INDM-251	10/26/2006	0.21		0.015	< MDL .015
INDM-251	3/10/2015	2	< MDL 2	0.007	< MDL .007
INDM-251	4/7/2015	2	< MDL 2	0.017	
INDM-251	5/12/2015	2	< MDL 2	0.037	
INDM-251	6/23/2015	2	< MDL 2	0.007	< MDL .007
INDM-251	7/14/2015	NR		0.007	< MDL .007
INDM-251	8/11/2015	2	< MDL 2	0.103	
INDM-251	9/8/2015	2	< MDL 2	0.007	< MDL .007
INDM-251	10/28/2015	2	< MDL 2	0.029	

MDL: Method Detection Limit

NR: Not Reported